**Table of Contents**

I. Purpose ................................................................................................................................................. 2
II. Scope .................................................................................................................................................... 2
III. Responsibilities .................................................................................................................................... 2
IV. Non-Permit Confined Space Entry ........................................................................................................ 5
V. Confined Space Entry ............................................................................................................................ 5
VI. Signage .................................................................................................................................................. 7
VII. Communication ..................................................................................................................................... 7
VIII. Air Monitoring ....................................................................................................................................... 7
IX. Rescue ................................................................................................................................................... 8
X. Hazardous Energy Isolation .................................................................................................................... 8
XI. Reclassification and Alternate Entry Procedures .................................................................................. 9
XII. Training ................................................................................................................................................. 9
XIII. Recordkeeping .................................................................................................................................... 10
XIV. Regulatory Authority and Related Information .................................................................................. 10
XV. Contact ................................................................................................................................................ 10
Appendix 1 – Confined Space Assessment Form ........................................................................................ 11
Appendix 2 – Confined Space Entry Permit ............................................................................................... 13
Appendix 3 – Confined Space Reclassification Form .................................................................................. 14
Appendix 4 – Confined Space Alternate Entry Form .................................................................................. 15
Appendix 5 – Guidelines for Contractors Working in Confined Spaces ...................................................... 16
Appendix 6 – Bump Test and Calibration Log Sheet ................................................................................... 17
Appendix 7 – Utility Tunnels ....................................................................................................................... 18
I. Purpose
This program establishes a process to protect employees from the hazards associated with the entry into confined spaces and provides guidance for the safe access and entry into, working in, and egress from confined spaces.

II. Scope
This program applies to all contractors and Northwestern employees who have to perform work in a confined space.

A. Definition
Confined spaces are defined as areas that:

i. Are large enough for an employee to enter and perform work,

ii. Have limited or restricted means for entry or exit, and

iii. Are not designed for continuous occupancy.

Examples of confined spaces at Northwestern are sewers, manholes, tunnels, tanks, boilers, transformers, pipes, excavations, elevator pits, vaults, and ducts. For the purpose of this program, there are two classifications of confined spaces:

i. Non-permit confined space – confined space that meets the definition of a confined space (above), but does not meet the requirements for a permit-required confined space (below).

ii. Permit-required confined space – confined space that has one or more of the following characteristics:

   a. Contains or has a potential to contain a hazardous atmosphere,
   
   b. Contains a material that has the potential for engulfing an entrant,
   
   c. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or a floor that slopes downward and tapers to a smaller cross section, or
   
   d. Contains any other recognized, serious safety or health hazard.

B. Evaluation
Assessments must be conducted to determine whether a confined space is classified as a non-permit confined space or a permit-required confined space (see Appendix 1). When there are changes in the use or configuration of a non-permit confined space, or when certain operations (e.g., welding, steam lines, chemicals) might introduce or create new hazards to entrants, the confined space must be re-evaluated prior to entry. If necessary, the space will be reclassified as a permit-required confined space.

III. Responsibilities

A. Risk Management

i. Review, audit, and revise this program and permit process annually or anytime deemed necessary.

ii. In collaboration with Facilities, assess new and existing confined spaces.

iii. Provide guidance and technical assistance as needed.

B. Facilities Operations

i. Prior to entry into a confined space, review or conduct a confined space assessment for the space to determine hazards and if a permit is required.

ii. Communicate all findings from confined space assessments with all employees or contractors involved or affected.
iii. Department chief, supervisor, or designee must approve entry into permit-required confined spaces, including contractors (see Appendix 5 for guidelines regarding contractors working in confined spaces).

iv. Ensure employees are fully informed, authorized, and trained in confined space entry requirements and procedures as outlined in this program.

v. Prevent unauthorized entry into permit-required confined spaces through training, signage, and security measures.

vi. Monitor employees’ need for additional or refresher training, based upon assigned duties, changes in confined spaces, or changes to this program.

vii. Collaborate with Risk Management to ensure each contractor’s Confined Space Program and permit process is compliant with regulatory and Northwestern requirements.

C. Project Managers

i. Inform contractors of work that involves any confined space entry and provide assessments for those spaces.

ii. Collaborate with Facilities when energy shutdowns or lifesaving impairments are necessary.

iii. Collaborate with Risk Management to ensure each contractor’s Confined Space Program and permit process is compliant with regulatory and Northwestern requirements.

iv. Inform and provide contractors with the Northwestern Confined Spaces Program and specific procedures developed for confined space entries.

v. For more guidelines regarding contractors working in confined spaces, see Appendix 5.

D. Authorized Entrants

i. Successfully complete confined space entry training.

ii. Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of exposure.

iii. Conduct assigned tasks in a safe manner at all times.

iv. Wear appropriate personal protective equipment correctly.

v. Maintain communication with the attendant to alert regarding the need to evacuate the space.

vi. Exit the space as quickly as possible whenever:
   a. An order to evacuate is given by the attendant or entry supervisor,
   b. An entrant recognizes any warning signs or symptoms of exposure to a dangerous situation,
   c. An entrant detects a prohibited condition, or
   d. An evacuation alarm is activated.

vii. Report any injuries, illnesses, questions, or any unsafe working conditions to the department Supervisor.

E. Authorized Attendants

i. Successfully complete confined space entry training.

ii. Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of exposure.

iii. Conduct assigned tasks in a safe manner at all times.

iv. Be aware of possible behavioral effects of hazard exposure of entrants.

v. Accurately record all data on the permit (e.g., names of individuals, date, time of entry, atmospheric data) and be the sole person responsible for the permit.
vi. Continuously maintain an accurate count of entrants in the space.

vii. Ensure an attendant is always present while entrants are in the space.

viii. Maintain communication with the entrants to assess entrant status and alert entrants of the need to evacuate immediately under the following conditions:
   a. If an attendant detects a prohibited condition,
   b. If an attendant detects the behavioral effects of hazard exposure in an entrant,
   c. If an attendant detects a situation outside the space that could endanger the entrants, or
   d. If an attendant cannot effectively and safely perform all the aforementioned duties.

ix. Summon rescue or other emergency services if entrants need assistance to escape from the space.

x. Ensure unauthorized entrants do not enter the permit-required confined space.

xi. Report any injuries, illnesses, questions, or any unsafe working conditions to the department Supervisor.

F. Authorized Entry Supervisors
   i. Successfully complete confined space entry training.
   ii. Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of exposure.
   iii. Conduct assigned tasks in a safe manner at all times.
   iv. Verify all tests specified by the Confined Space Entry Permit have been conducted and all procedures and equipment specified on the permit are in place prior to endorsing the permit and allowing entry to begin.
   v. Terminate the entry permit, whenever warranted.
   vi. Verify rescue services are available and a means to summon them is operable.
   vii. Report any injuries, illnesses, questions, or any unsafe working conditions to the department Supervisor.

G. Contractors
   i. Provide a copy of a site-specific/project-specific confined space program to Northwestern Facilities Operations or Capital Projects and Risk Management; this program must meet or exceed the minimum requirements set forth in this program, in addition to the General Industry and/or Construction Confined Spaces regulations, if applicable.
   ii. Obtain copies of all necessary confined space assessments, and coordinate all confined space entries with Facilities, including when both Northwestern and contractor personnel will be working in or near confined spaces; contractors must receive authorization from Facilities prior to entry in a confined space.
   iii. Ensure employees are properly trained in confined space entries.
   iv. Provide the necessary equipment, personal protective equipment, personnel, and resources necessary for safe entry into confined spaces, including air-monitoring equipment.
   v. Post permits at confined space entry sites for the duration of the entry. Contractors must use their own confined space permits and provide completed permits to Facilities Operations or Capital Projects.
   vi. Inform Northwestern Facilities Operations or Capital Projects of any hazards confronted or created in the confined space.
vii. Develop rescue procedures specific to the space(s) entered. Effective means of rescue must be in place by use of a non-entry retrieval system (i.e., a tripod, winch, lifeline, and body harness). If a non-entry retrieval system will be ineffective for entrant rescue, a rescue team must be on standby outside the space with all necessary tools and equipment to perform an entry rescue.

viii. In the event of an emergency requiring confined space rescue, the authorized entry supervisor or attendant will immediately notify emergency services.

IV. Non-Permit Confined Space Entry

A. Before entry into non-permit confined spaces, supervisors must determine whether conditions have changed that might make the space a permit-required confined space. Examples include introduction or intrusion of a hazardous substance (e.g., flooding) or atmosphere (e.g., active steam release) and known or assumed structural failure. If such conditions develop, supervisors must contact Risk Management to assist with a hazard assessment to conduct a permit entry.

B. If non-permit confined spaces have no hazards, entry can be done without using the permit system.

V. Confined Space Entry

A. Pre-Entry

i. Notify Risk Management at (847) 491-4936 prior to entry into a permit-required confined space.

ii. Notify University Police prior to entry into a permit-required confined space; this information must be noted on the entry permit.
   a. Evanston Campus: (847) 491-3254
   b. Chicago Campus: (312) 503-3456

iii. Review the confined space assessment (see Appendix 1 for a blank assessment) to determine if a permit is required to enter the confined space.

iv. Evaluate the work activities and conditions, and develop a Safe Operating Procedure (SOP) that addresses the work conditions, hazards, responsibilities, assigned duties, communication, and rescue/emergency services procedures.

v. Review the SOP with all parties involved during a pre-work briefing.

vi. Test all air monitoring equipment before each entry into a confined space in accordance with the manufacturer’s instructions, and calibrate if necessary.

vii. No employee may enter a confined space until all identified hazards are eliminated or controlled and acceptable entry conditions have been established.

viii. Because confined spaces may be immediately dangerous to life and health (IDLH), continuous forced air ventilation must be used to eliminate the potentially hazardous atmosphere:
   a. Air must be taken from a clean source and continued until all employees have left the space.
   b. If the minimum oxygen content of 19.5% cannot be maintained by forced air ventilation and the environment is oxygen-deficient, consult with Facilities Operations and Risk Management.
   c. This method cannot be used if asbestos is present in the space.

ix. Before authorized entrants enter the space, the internal atmosphere must be tested with a calibrated, direct-reading instrument (see Section VIII).
a. Retain and record all air monitoring test/calibration data on the permit.

b. The entry supervisor must ensure air monitoring has been conducted within 15 minutes prior to entering any permit-required confined space.

c. Communicate all air monitoring results to all entrants or their authorized representative.

x. Complete and post the authorized confined space permit at the entry portal, or by any other equally effective, conspicuous manner, prior to beginning work.

B. Entry

i. Only trained and authorized employees may enter a confined space or act as an attendant or supervisor; measures must be in place to prevent unauthorized entries.

ii. During permit-required confined space entries, an attendant must be present at all times; the attendant cannot perform any other tasks that could potentially interfere with his/her abilities to provide any/all support necessary to the entrant(s).

iii. Smoking is prohibited in confined spaces and near the entrance/exit area. Keep running vehicles away from the permit workspace.

iv. Maintain constant visual or voice communication between the attendant and entrants entering a permit-required confined space using intrinsically safe communications (see Section VII).

v. Access spaces with engulfment hazards away from affected areas or by top entry only.

vi. Protect all openings to confined spaces with barriers when hatches, covers, or lids are removed to protect entrants and others from potential hazards.

vii. When the possibility of a release of hazardous energy exists, appropriate lockout/tag out procedures must be utilized (see Section X).

viii. Utilize all required personal protective equipment, as indicated in the SOP.

ix. In the event a hazardous atmosphere or condition is detected or suspected at any time during a confined space entry, all personnel must exit the space immediately and measures must be implemented to protect employees from the hazards before any subsequent entries take place; department supervisors must be notified.

x. If an emergency rescue becomes necessary, the Entry Supervisor or Attendant must notify University Police immediately and provide information, guidance, and assistance as necessary. Northwestern employees are not permitted to enter a confined space to perform a rescue under any circumstances.

C. Post-Entry

i. When all work is complete and personnel have exited the confined space, the Entry Supervisor must:

   a. Ensure the worksite is returned to safe conditions,
   b. Close out the permit,
   c. Notify University Police the entry has been completed, and
   d. Document any problems encountered during the entry.

ii. Provide copies of all SOPs, permits, and any other relevant documentation (e.g., hot work permits) to Risk Management for post-entry review, who will:

   a. Evaluate the entry permit and any other relevant documents to ensure they were completed properly,
   b. Review the SOP to ensure all personnel involved signed it,
c. Provide immediate feedback and guidance to supervisors for any deficiencies identified, and
d. Maintain permits for at least three years to facilitate the review of the Confined Spaces Program.

VI. Signage
A. Requirements
For all permit-required confined spaces, post appropriate signage at the entry portal, hatch, cover, or equally effective location.
B. Outdoor Manhole Covers and Hatches
i. Outdoor manhole covers and hatches for permit-required confined spaces are not required to have signage, as long as access points are kept locked or require special tools, such as a crowbar or pry bar, to open.
ii. Number all access points to permit-required confined spaces that do not have posted signage in a conspicuous manner, such as with paint, tag, or other effective means, for identification purposes.

VII. Communication
A. Departments and contractors must ensure two-way communication is available during all permit-required confined space entries and are responsible for ensuring adequate communication:
   i. Between those inside the confined space,
   ii. Between those inside the confined space and those outside, and
   iii. To summon emergency responders in the event of an emergency.
B. Examples of acceptable forms of communication are:
   i. UHF portable radio;
   ii. Cellular phone;
   iii. Verbal;
   iv. Tapping;
   v. Fixed telephone, if available;
   vi. Visual (e.g., hand signals); and
   vii. Tugs on a lifeline.
C. Cellular service and UHF radio coverage may be limited in certain confined spaces at Northwestern. Effective communication is required for all permit-required confined space entries.

VIII. Air Monitoring
A. Departments are responsible for maintaining, calibrating, and operating all air monitoring equipment according to the manufacturer’s instructions.
   i. Prior to performing air monitoring for permit-required confined space entry, perform a bump test or full calibration in accordance with the manufacturer’s instructions using the appropriate test gas.
   ii. Adjust instruments that fail a bump test by a full calibration before further use.
   iii. Calibration of air monitoring equipment must be performed monthly and documented.
B. Before authorized entrants enter the space and while entrants work in the space, atmospheric conditions must remain within the following limits:
Confined Spaces  8
Risk Management ● April 2020

i. Oxygen: between 19.5% and 23.5%
ii. Lower Explosive Limit (LEL): less than 10%
iii. Carbon Monoxide (CO): less than 35 ppm (parts per million)
iv. Hydrogen Sulfide (H₂S): less than 10 ppm (parts per million)

IX. Rescue

A. Rescue Procedures
   i. Rescue procedures are required for all permit-required confined space entries.
   ii. If an entrant requires rescue from a confined space, the Entry Supervisor or Attendant must notify the University Police immediately.
   iii. Northwestern employees are not permitted to enter a confined space to perform a rescue under any circumstances.

B. Rescue Methods
   There are two types of rescue: entry and non-entry.
   i. Only trained rescue professionals can perform entry rescue.
   ii. Trained attendants and entry supervisors may perform non-entry rescue with the use of a retrieval system.

C. Rescue Method Selection
   i. Retrieval systems, such as tripods, must be set-up and used whenever an employee enters a permit-required confined space to facilitate non-entry rescue, if needed.
   ii. Retrieval systems must include a chest or full-body harness, retrieval line, and a mechanical retrieval device (if the vertical space is over 5 feet deep).
   iii. The retrieval system is not required if the equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant.
   iv. If non-entry retrieval equipment will not be effective, a means of entry rescue must be in place, such as a standby rescue team with SCBAs. Confined space assessments must be communicated to rescue teams, and the rescue team must review and sign the Safe Operating Procedure.

X. Hazardous Energy Isolation

A. When hazardous energy must be isolated, the procedures outlined in the Control of Hazardous Energy (Lockout/Tagout) Program must be followed.
B. Isolation is required to declassify a permit-required confined space to a non-permit required confined space.
C. Isolation or de-energization of hazardous energy is required using documented lockout/tagout procedures if there are any foreseeable, serious hazards (e.g., visible or suspected steam leaks, corroded piping, other known conditions that could result in the potential release of hazardous energy). Examples of when hazardous energy must be isolated include:
   i. Line breaking;
   ii. Installation, repair, or demolition of system components;
   iii. Adjusting or tightening compression seals, such as flanges;
   iv. Draining or releasing hot water from steam traps or condensate lines; and
   v. Any work in normally flooded spaces, such as boilers and water tanks.
D. If hazardous energy cannot be isolated or de-energized prior to entry (e.g., performing leak detection), a Safe Operating Procedure and director-level authorization using a Live
Electrical/Utility Authorization Form (see Northwestern’s Working On or Near Utilities Procedures) are required, in addition to a Confined Space Entry Permit.

E. When entering a space that contains a foreseeable steam release hazard (e.g., steam leak, corroded steam piping), the steam pressure must be reduced to 30psi (274°F) or lower; entrants must wear adequate personal protective equipment.

F. Isolation of hazardous energy is NOT required in permit-required confined spaces where there is no foreseeable exposure to physical hazards (e.g., no visible or suspected steam leaks, no corroded piping, no other known conditions that could result in the potential release of hazardous energy) for the following tasks:
   i. Walkthrough inspections and other work in tunnels and vaults not related to the utility systems that are present.
   ii. Manipulation of valve handles to adjust flow, including sectionalizing or isolating.
   iii. When physical hazards are contained or enclosed, such as:
      a. Electrical hazards that are enclosed in conduit or enclosures.
      b. Flowable physical hazards, such as steam, water, or liquids, that are:
         1. Contained in tanks;
         2. Enclosed in sealed piping and piping components, such as valves and traps; and
         3. Where there is no eminent risk of direct exposure to the contained hazard.
   iv. If at any time a hazard develops or is discovered while in the space (e.g., discovery of a previously unknown steam leak), the space must be immediately evacuated and re-evaluated.

XI. Reclassification and Alternate Entry Procedures

A. Reclassification
   i. If no actual or potential atmospheric hazards are present, all other serious hazards are eliminated, and there is no evidence any hazards are present or imminent, the space may be temporarily entered using the reclassification form (see Appendix 3) instead of using a permit.
   ii. Entry operations are immediately canceled when the work is completed, a condition that is not allowed under the form arises, or after 8 hours. Re-entry into the space requires a permit or new reclassification form.
   iii. The reclassification form may not be used at the following locations:
      a. Evanston campus lift stations
      b. Evanston Central Utility Plant
      c. Chicago Heating Plant

B. Alternate Entry Procedures
   Risk Management has determined there are no permit-required confined spaces at Northwestern that meet the criteria for using alternate entry procedures. However, in the rare circumstance that a space becomes eligible for using alternate entry procedures, written approval and authorization is required from Risk Management and the Entry Supervisor. Refer to Appendix 4 for the alternate entry procedures form.

XII. Training

A. Responsibility
Departments are responsible for ensuring employees are properly trained and proficient in the duties required for confined space entry. Additional training is required when procedures are updated or a new hazard exists.

B. **Requirements**
Confined space entry training is required:

i. Before an employee is initially assigned a task involving a confined space as a supervisor, entrant, or attendant,

ii. Whenever there is a change in a confined space that presents hazards(s) to which the employee has not been previously trained, or

iii. If there are observed inadequacies in an employee’s knowledge or execution of confined space procedures.

C. **Refresher Training**
Confined space refresher training is required every 3 years for all employees involved in confined space operations.

XIII. **Recordkeeping**
Departments are responsible for maintaining confined space records.

A. Northwestern and contractor entry permits and associated forms (e.g., Safe Operating Procedures, Hot Work Permits, Live Utility Work Authorizations) must be retained for at least three years.

B. Air monitoring instrument records (i.e., bump tests, calibrations, and service repairs) must be retained for at least three years. Electronic means, such as instrument software, may be used to record this information in lieu of paper logs, if available. Refer to Appendix 6 for an example of a bump test and calibration log sheet.

C. Facilities is responsible for maintaining the confined space assessments, either electronically or in a hard copy format. Assessments must be readily available, as long as they are valid and accurate. Any new assessments or changes to existing assessments must be included, as necessary.

D. Departments are responsible for maintaining employee training records and must be kept for a minimum of three years; records must include employees’ names, trainers’ signatures or initials, and dates of training.

XIV. **Regulatory Authority and Related Information**
Northwestern and contractors will comply with the Occupational Safety and Health Administration’s (OSHA) standards, National Fire Protection Association’s (NFPA) codes, and any other applicable codes and standards, including:

- OSHA 29 CFR 1910.146 – Permit-Required Confined Spaces
- OSHA 29 CFR 1926 Subpart AA – Confined Spaces in Construction
- Northwestern’s Working On or Near Utilities Procedures
- Northwestern’s Control of Hazardous Energy (Lockout/Tagout) Program

XV. **Contact**
For questions, contact Gwen Butler, Director, Environmental Health and Safety, at gwen.butler@northwestern.edu or (847) 491-4936.
Appendix 1 – Confined Space Assessment Form

**Instructions:** All confined spaces must be assessed using this form. The purpose of this form is to identify the hazards and characteristics of a space to determine if it is a non-permit required space or a permit-required confined space. This assessment does not replace a Confined Space Entry Permit. This assessment must be reviewed by the entry team prior to any entry into a permit-required confined space.

### Section A: General Information

<table>
<thead>
<tr>
<th></th>
<th>Date of Assessment:</th>
<th>Assessment Conducted by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Associated Building(s):</td>
<td>Location:</td>
</tr>
<tr>
<td>3</td>
<td>Type of Space:</td>
<td>Purpose of Entry:</td>
</tr>
</tbody>
</table>

### Section B: Confined Space Determination

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>The space is large enough and is so configured that an employee can bodily enter and perform assigned work.</td>
</tr>
<tr>
<td>5</td>
<td>The space has limited or restricted means of entry or exit.</td>
</tr>
<tr>
<td>6</td>
<td>The space is not designed for continuous employee occupancy.</td>
</tr>
<tr>
<td>7</td>
<td>If items 4-6 were all marked <strong>Yes</strong>, then the space is considered a confined space; proceed to the next section. If you answered <strong>No</strong> to 4, 5, or 6, the space is not a confined space; check the box below.</td>
</tr>
<tr>
<td>8</td>
<td>The space does not qualify as a “confined space”:</td>
</tr>
</tbody>
</table>

### Section C: Atmospheric Hazards

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Does the space have or have the potential to contain a hazardous atmosphere?</td>
</tr>
<tr>
<td>9</td>
<td>Oxygen Deficient (O₂ below 19.5%):</td>
</tr>
<tr>
<td>10</td>
<td>Oxygen Enriched (O₂ above 23.5%):</td>
</tr>
<tr>
<td>11</td>
<td>Explosive Gas/Vapor:</td>
</tr>
<tr>
<td>12</td>
<td>Hydrogen Sulfide (H₂S):</td>
</tr>
<tr>
<td>13</td>
<td>Carbon Monoxide (CO):</td>
</tr>
<tr>
<td>14</td>
<td>Chlorine (Cl₂):</td>
</tr>
<tr>
<td>15</td>
<td>Other (specify):</td>
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### Section D: Engulfment Hazards

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<th>No</th>
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<tr>
<td>12</td>
<td>Does the space have the potential to engulf or suffocate the entrant?</td>
</tr>
<tr>
<td>13</td>
<td>Sand:</td>
</tr>
<tr>
<td>14</td>
<td>Water:</td>
</tr>
<tr>
<td>15</td>
<td>Soil:</td>
</tr>
<tr>
<td>16</td>
<td>Gravel/Rock:</td>
</tr>
<tr>
<td>17</td>
<td>Sewage:</td>
</tr>
<tr>
<td>18</td>
<td>Oil:</td>
</tr>
<tr>
<td>19</td>
<td>Other (specify):</td>
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### Section E: Entrapment Hazards

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<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Does the space have an internal configuration that an entrant could become trapped?</td>
</tr>
<tr>
<td>16</td>
<td>Converging Walls/Downward Sloping:</td>
</tr>
<tr>
<td>17</td>
<td>Constriction/Taper to a Smaller Cross-Section:</td>
</tr>
<tr>
<td>18</td>
<td>Difficult Exit/Inadequate Access:</td>
</tr>
<tr>
<td>19</td>
<td>Other (specify):</td>
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### Section F: Other Serious Hazards

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<th></th>
<th>Yes</th>
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<tbody>
<tr>
<td>18</td>
<td>Is there a potential for any other serious safety and health hazards?</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>If Yes, check the hazard(s) below.</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Electrical:</td>
<td>Moving Parts:</td>
</tr>
<tr>
<td>20</td>
<td>Hot/Cold Extremes:</td>
<td>Noise/Vibration:</td>
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<td>21</td>
<td>Skin/Eye Irritants:</td>
<td>Pressurized Steam/Condensate:</td>
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<td>22</td>
<td>Pneumatic Energy:</td>
<td>Hydraulic Energy:</td>
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<td>23</td>
<td>Other (specify):</td>
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### Section G: Access

<table>
<thead>
<tr>
<th></th>
<th>Fixed Ladder:</th>
<th>Portable Ladder:</th>
<th>Stairs:</th>
<th>Door:</th>
<th>Hatch:</th>
<th>Manhole:</th>
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<td>25</td>
<td>Other (specify)</td>
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### Section H: Ventilation

<table>
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<th>Unfavorable Natural:</th>
<th>Favorable Natural:</th>
<th>Mechanical:</th>
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<tbody>
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<td>26</td>
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<td></td>
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</tr>
<tr>
<td>27</td>
<td></td>
<td>Mechanical ventilation is required in the space:</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

### Section I: Rescue

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>Does the space have an internal configuration where non-entry rescue equipment (e.g., tripod and winch) will be effective in rescuing the entrant?</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Does the space have an internal configuration where non-entry rescue equipment (e.g., tripod and winch) may be ineffective in rescuing the entrant, depending on where the work is being performed inside the space?</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Will a standby rescue service be required outside the space if non-entry rescue equipment is ineffective in rescuing the entrant?</td>
<td></td>
</tr>
</tbody>
</table>

### Section J: Determination

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>31</td>
<td>Is the space a Permit-Required Confined Space? If items 8, 12, or 15 were marked Yes, a permit is required to enter the space.</td>
<td>X</td>
</tr>
</tbody>
</table>

### Section K: Reclassification

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>Is it possible to eliminate all actual or potential atmospheric hazards? (items 8-11)</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>Is it possible to eliminate all hazards within the space without entry into the space? (items 12-23)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If items 32 and 33 were marked Yes, the permit-required confined space may be reclassified as a non-permit confined space.</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>The space qualifies for reclassification as a non-permit required confined space:</td>
<td></td>
</tr>
</tbody>
</table>

### Section L: Hazardous Energy Isolation

Harms indicated in sections C through F may require isolation or de-energization in accordance with Northwestern’s Control of Hazardous Energy (Lockout/Tagout) Program prior to entry.
### Appendix 2 – Confined Space Entry Permit

**CONFINED SPACE ENTRY PERMIT**

| Permits to be posted at the point of entry or by any other equally effective, conspicuous manner. |
| Permits are valid for no more than 1 shift (8 hours). |

#### General

| Space to be Entered: | Date & Time Issued: |
| Location of Space: | Date & Time of Expiration: |
| Purpose of Entry: | Department or Contractor: |
| ENTRANT(S): | |
| ATTENDANT(S): | |

#### Requirements

| Assessment Reviewed: | Actual or Potential Hazards: | Yes | N/A | Special Equipment |
| Secure Area or Work Zone (e.g., barricading, fencing-off) | | | | Fire Extinguisher (not CO<sub>2</sub>) |
| Pumps / Lines Blanked, Blocked, Capped (i.e., LOTO) | | | | Special Lighting (e.g., explosion-proof) |
| Purging, Flushing, Venting of Utility Lines | | | | Portable Blower (i.e., forced-air ventilation) |
| Other Permits (e.g., Hot Work): | (specify) | | | Water Pumps |
| Other Special Requirements: | (specify) | Other Equipment: | (specify) |
| Entrant Communication: | ☐ Radio ☐ Cellular Phone ☐ Visual ☐ Verbal ☐ Fixed Telephone ☐ Other (specify) |
| Required Personal Protective Equipment: | ☐ Gloves (specify) ☐ Safety Glasses ☐ Goggles ☐ Face Shield ☐ Hardhat ☐ Ear Plugs/Ear Muffs |
| ☐ Safety Shoes/Boots (specify) ☐ Body Protection ☐ Respirator ☐ Other (specify) |

#### Atmospheric Testing

| Atmospheric Gases (test in this order) | Permissible Limits (must be within limits) | Pre-Entry Time | AM | PM | AM | PM | AM | PM | AM | PM |
| Oxygen (O<sub>2</sub>) | 19.5% to 23.5% | % | % | % | % | % | % |
| LEL (Lower Explosive Limit) | Under 10% | % | % | % | % | % | % |
| Carbon Monoxide (CO) | Under 35 ppm | ppm | ppm | ppm | ppm | ppm |
| Hydrogen Sulfide (H<sub>2</sub>S) | Under 10 ppm | ppm | ppm | ppm | ppm | ppm |
| Other: (specify) | (specify) | |

| Monitoring Equipment Make and Model | Serial Number | Calibration Date | Tester’s Initials: | |
| Rescue Method | Yes | N/A | Attendant Requirement | Yes | N/A |
| Non-Entry Retrieval Equipment (e.g., tripod, lifeline, hoist, harness) | | Trained in the Use of Non-Entry Equipment |
| Rescue Service On-Site (SCBAs, entry retrieval equipment) | | Has Means to Summon Rescue Services (required) |
| Rescue Communication: | ☐ Radio ☐ Cellular Phone ☐ Visual ☐ Verbal ☐ Fixed Telephone ☐ Other (specify) |
| Northwestern Police Notified Prior to Entry: | ☐ Evanston Campus (847) 491-3254 ☐ Chicago Campus (312) 503-3456 |

#### Authorization

I have reviewed the work authorized by this permit and the information contained here-in. This permit is not valid unless all appropriate items are completed. I certify that all actions and conditions necessary for safe entry have been performed.

Chief or Supervisor Authorizing Entry: [sign]

#### Cancellation

Entry will be terminated and this permit will be cancelled when: 1) The entry operations covered by the permit have been completed; or 2) A condition that is not allowed under the entry permit arises in or near the permit space. Re-entry into the confined space will not be allowed until a new assessment is completed and permit is issued.

**Permit must be cancelled by Entry Supervisor and kept on file by departments for 3 years.**

Permit Cancelled by: [name] Date & Time: [date] & [Time]

| Reason: | ☐ Work Complete ☐ Rescue Unavailable ☐ Conditions Violate Permit ☐ New Hazards ☐ Other (specify) | | |

**Confined Spaces**

Risk Management ● April 2020
Use this form to temporarily classify a permit-required confined space as a non-permit required confined space. Post form at entry site.

## CONFINED SPACE RECLASSIFICATION FORM

Not for use at the Evanston Utility Plant, Chicago Heating Plant, and Evanston Lift Stations

This form is only valid for the duration of work being performed and for no more than 8 hours.

### General
- **Space to be Entered:**
- **Date & Time Issued:**
- **Location of Space:**
- **Date & Time of Expiration:**
- **Purpose of Entry:**
- **Department or Contractor:**
- **ENTRANT(S):**
- **ATTENDANT(S):**

### Requirements

#### Confined Space Assessment Criteria for Reclassification

- Has the confined space hazard assessment form been reviewed?
- Has the atmosphere been tested at all levels within the space and are results within permissible limits? (Record pre-entry results below and re-test at least every two hours.)
- Have all potential or actual atmospheric hazards been eliminated?
- Have all serious hazards within the space been eliminated without entry into the space? (e.g., entrapment, engulfment, exposed steam, exposed electrical, extreme temperatures, mechanical)
- Will work being done inside or near the space not introduce new serious hazards? (e.g., welding, chemicals, exposed steam, exposed electrical, painting fumes)
- Will continuous forced-air ventilation be in use for the duration of work being performed inside the space?
- Will an attendant be outside the space anytime work is being performed inside the space? (Attendant must have means to communicate with entrant and ability to summon rescue services, e.g., 911, UHF Radio.)

### Atmospheric Testing

#### Atmospheric Gases

<table>
<thead>
<tr>
<th>Gas</th>
<th>Pre-Entry Time</th>
<th>Time During Entry – Record Readings Every 2 Hours (8-Hour Maximum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen (O₂)</td>
<td>AM PM</td>
<td>AM PM AM AM PM PM PM PM</td>
</tr>
<tr>
<td>LEL (Lower Explosive Limit)</td>
<td>% % % % % % % % % %</td>
<td></td>
</tr>
<tr>
<td>Carbon Monoxide (CO)</td>
<td>Under 35 ppm</td>
<td>ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm</td>
</tr>
<tr>
<td>Hydrogen Sulfide (H₂S)</td>
<td>Under 10 ppm</td>
<td>ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm</td>
</tr>
</tbody>
</table>

#### Other:

(specify)

Tester's Initials:

- Monitoring Equipment Make and Model
- Serial Number
- Calibration Date
- Bump Test Passed Prior to Use? (required)

### Final Determination

- If all criteria are checked ‘Yes’ in the requirements section, employees may temporarily enter the confined space without a permit.

### Authorization

I have reviewed the work authorized by this form and the information contained here-in. This form is not valid unless all appropriate items are completed. I certify that all actions and conditions necessary for safe entry have been performed.

**Chief or Supervisor Authorizing Entry:** [print] [sign]

### Cancellation

Entry will be terminated and this form will be cancelled when:
1) The entry operations covered by this form have been completed;
2) A condition that is not allowed under this form arises in or near the space. Re-entry into the confined space will not be allowed until all hazards are controlled or eliminated and a new reclassification form or permit is completed.

Form must cancelled by Entry Supervisor and kept on file by departments for 3 years.

**Form Cancelled by:** [print] [sign]

**Date & Time:**

**Reason:**
- Work Complete
- Conditions Violate Form
- New Hazards
- Other (specify)
## Confined Space Alternate Entry Form

**Use this form to temporarily enter a permit-required confined space using Alternate Entry Procedures (no permit required).** Post form at entry site.

### General

<table>
<thead>
<tr>
<th>Space to be Entered:</th>
<th>Date &amp; Time Issued:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location of Space:</td>
<td>Date &amp; Time of Expiration:</td>
</tr>
<tr>
<td>Purpose of Entry:</td>
<td>Department or Contractor:</td>
</tr>
<tr>
<td>ENTRANT(S):</td>
<td>Attendant(S):</td>
</tr>
</tbody>
</table>

### Requirements

**Confined Space Assessment Criteria for Alternate Entry Procedures**

Complete the following questions:

- Has the confined space hazard assessment form been reviewed?
- Is the only hazard in the space an actual or potential hazardous atmosphere?  
  - [ ] Yes  
  - [ ] No Specify:
- Have all serious hazards within the space been eliminated without entry into the space?  
  (e.g., entrapment, engulfment, exposed steam, exposed electrical, extreme temperatures, mechanical)
- Will continuous forced-air ventilation alone be sufficient to maintain the space safe for entry?  
  (Record pre-entry results below and re-test at least every two hours.)
- Will continuous forced-air ventilation be in use for the duration of work being performed inside the space?
- Will work being done inside or near the space not introduce new serious hazards?  
  (e.g., welding, chemicals, exposed steam, exposed electrical, painting fumes)
- Will an attendant be outside the space any time work is being performed inside the space?  
  (Attendant must have the means to communicate with entrant and ability to summon rescue services, e.g., 911, UHF Radio.)

### Atmospheric Testing

**Atmospheric Gases (test in this order)**

<table>
<thead>
<tr>
<th>Atmospheric Gases (must be within limits)</th>
<th>Permissible Limits</th>
<th>Pre-Entry Time – AM</th>
<th>Time During Entry – Record Readings Every 2 Hours (8-Hour Maximum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen (O₂)</td>
<td>19.5% to 23.5%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>LEL (Lower Explosive Limit)</td>
<td>Under 10%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Carbon Monoxide (CO)</td>
<td>Under 35 ppm</td>
<td>ppm</td>
<td>ppm</td>
</tr>
<tr>
<td>Hydrogen Sulfide (H₂S)</td>
<td>Under 10 ppm</td>
<td>ppm</td>
<td>ppm</td>
</tr>
<tr>
<td>Other:</td>
<td>(specify)</td>
<td>(specify)</td>
<td>(specify)</td>
</tr>
</tbody>
</table>

**Tester’s Initials:**

<table>
<thead>
<tr>
<th>Monitoring Equipment Make and Model</th>
<th>Serial Number</th>
<th>Calibration Date</th>
</tr>
</thead>
</table>

**Bump Test Passed Prior to Use?**  
- [ ] Yes  
- [ ] No

**Final Determination**

- If all conditions are checked ‘YES’ in the requirements section, employees may temporarily enter the confined space without a permit.

| [ ] Conditions are Safe for Temporary Entry Without a Permit |
| [ ] Conditions are Unsafe for Temporary Entry Without a Permit |

## Authorization

We have reviewed the work authorized by this form and the information contained here-in. This form is not valid unless all appropriate items are completed. We certify that all actions and conditions necessary for safe entry have been performed.

- Risk Management Representative: [Print]  
- Chief or Supervisor Authorizing Entry: [Print]

## Cancellation

- Entry will be terminated and this form will be cancelled when: 1) The entry operations covered by this form have been completed; or 2) A condition that is not allowed under this form arises in or near the space. Re-entry into the confined space will not be allowed until all hazards are controlled or eliminated and a new alternate entry form or permit is completed.

**Form must cancelled by Entry Supervisor and kept on file by departments for 3 years.**

- Cancelled by: [Print]  
- Date & Time: [Date & Time]

- Reason:  
  - [ ] Work Complete  
  - [ ] Conditions Violate Form  
  - [ ] New Hazards  
  - [ ] Other (specify)
Appendix 5 – Guidelines for Contractors Working in Confined Spaces

Northwestern Facilities Operations, Capital Projects, and Project Managers should use these guidelines to ensure all requirements of the Northwestern Confined Space Program and Control of Hazardous Energy Program are met prior to contractors entering and working in permit-required confined spaces, such as vaults, tanks, and elevator pits. Northwestern Facilities Operations, Capital Projects, and Project Managers must retain copies of all contractor confined space entry permits for at least 3 years.

### Northwestern Requirements

<table>
<thead>
<tr>
<th>#</th>
<th>Requirement</th>
<th>Group Responsible</th>
<th>Complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Provide Statement of Work that indicates the contractor will provide confined space equipment, rescue equipment, and trained employees.</td>
<td>Facilities Operations or Capital Projects</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Provide contractor with the confined space assessment and identify any hazards inside or associated with the confined space.</td>
<td>Facilities Operations, Capital Projects, or Risk Management</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Isolate or de-energize all sources of hazardous energy and communicate isolations to contractor.</td>
<td>Facilities Operations</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Review contractor confined space entry permit and authorize entry (sign and date the permit).</td>
<td>Facilities Operations or Capital Projects</td>
<td></td>
</tr>
</tbody>
</table>

### Contractor Requirements

<table>
<thead>
<tr>
<th>#</th>
<th>Requirement</th>
<th>Verified by</th>
<th>Complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Provide written procedures for work to be performed inside the confined space, including entry and rescue methods and procedures.</td>
<td>Facilities Operations or Capital Projects</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Attach lockout/tagout device(s) to all hazardous energy source isolations.</td>
<td>Facilities Operations</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Provide confined space entry permit and submit to Northwestern for entry authorization.</td>
<td>Facilities Operations or Capital Projects</td>
<td></td>
</tr>
</tbody>
</table>

### Program Resources

- Northwestern’s Confined Spaces Program
- Northwestern’s Control of Hazardous Energy (Lockout/Tagout) Program
- Northwestern’s Working On or Near Utilities Procedures
## Appendix 6 – Bump Test and Calibration Log Sheet

<table>
<thead>
<tr>
<th>Date</th>
<th>Make and Model</th>
<th>Serial Number</th>
<th>Type of Test</th>
<th>Passed</th>
<th>Failed</th>
<th>Tester’s Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Bump</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Calibration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 7 – Utility Tunnels

A. **Purpose**
   This appendix establishes the minimum safe working procedures and guidelines for working in Northwestern’s utility tunnels.

B. **Scope**
   Some of the tunnels on Northwestern’s Evanston and Chicago campuses are considered “Passageway Tunnels” and are not covered under this appendix. This appendix applies to all Northwestern employees and contractors who work in the utility tunnels, most of which meet all three or two of the three definition requirements of confined spaces:
   i. Large enough to enter and perform work;
   ii. Have limited or restricted means for entry or exit (i.e., fixed ladder and hatch for egress, dead-end more than 50-feet in length, requiring climbing over pipes, and/or requiring navigating through tight spaces); and
   iii. Not designed for continuous occupancy (i.e., does not have lighting and sufficient natural or forced ventilation; unfavorable natural ventilation that could contain or produce dangerous air contaminants does not qualify).

Utility tunnels are classified based on the conditions present and their design and configuration:
   i. **Restricted Utility Tunnels** have a limited or restricted means for entry or exit, but are designed for continuous occupancy; as such, they are not classified as confined spaces, but Northwestern restricts access to authorized and trained personnel.
   ii. **Confined Space Utility Tunnels** have limited or restricted means for entry or exit and are not designed for continuous occupancy; as such, they are classified as confined spaces, and, due to the nature of and hazards within the tunnels, all Confined Space Utility Tunnels are considered permit-required spaces.

<table>
<thead>
<tr>
<th>Table 1 – Classification of Northwestern’s Utility Tunnels</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Restricted Utility Tunnels</strong></td>
</tr>
<tr>
<td>• Deering Tunnel (EV)</td>
</tr>
<tr>
<td>• Deering 105 Mechanical Tunnel (EV) <em>(partial)</em></td>
</tr>
<tr>
<td>• Fisk-Locy Tunnel (EV) <em>(partial)</em></td>
</tr>
<tr>
<td>• Hogan Tunnel (EV)</td>
</tr>
<tr>
<td>• Kresge Underground Tunnel (EV)</td>
</tr>
<tr>
<td>• Main Steam Tunnel (CH)</td>
</tr>
<tr>
<td>• North Swift Tunnel (EV)</td>
</tr>
<tr>
<td>• North Tech Tunnel (EV)</td>
</tr>
<tr>
<td>• Sargent Karl Wolff Tunnel (EV)</td>
</tr>
<tr>
<td>• South Swift Tunnel (EV)</td>
</tr>
<tr>
<td>• Tarry Tunnel (CH)</td>
</tr>
<tr>
<td>• Tech-Catalysis Tunnel (EV)</td>
</tr>
<tr>
<td><strong>Confined Space Utility Tunnels</strong></td>
</tr>
<tr>
<td>• Deering 105 Mechanical Tunnel (EV) <em>(partial)</em></td>
</tr>
<tr>
<td>• Fisk-Locy Tunnel (EV) <em>(partial)</em></td>
</tr>
<tr>
<td>• Wirtz Tunnel (EV)</td>
</tr>
</tbody>
</table>

C. **Utility Tunnel Entry Requirements**
   i. **Preplanning for Work**
      a. Employees must notify their supervisor prior to entering utility tunnels and discuss the scope of work to be performed in the tunnel.
      b. The supervisor must verify that the employee has received the proper training.
ii. **Required Documents**
   a. **Restricted Utility Tunnels** require a Safe Operating Procedure (see *Working On or Near Utilities Procedures*) in order to perform work in them.
   b. **Confined Space Utility Tunnels** require a Safe Operating Procedure (see *Working On or Near Utilities Procedures*) and Confined Space Permit (see Appendix 2) prior to entry.

iii. **Proper Clothing and Equipment**
   a. Long pants are required to protect lower extremities from burns and cuts when crossing steam lines and walking in tight quarters.
   b. A communication device (radio or cell phone) is required in utility tunnels.
   c. Additional equipment and protective clothing (e.g., flashlight, safety footwear, safety glasses, hardhat, leather gloves, long-sleeve shirt) may also be required.

iv. **Security**
   a. Facilities, University Police, Information Technology, and Risk Management have permanent access to the utility tunnels. If employees from other departments or contractors need access, they must coordinate entry with Facilities.
   b. All access points for utility tunnels must be either secured or continuously monitored during entry to prevent unauthorized entry.
   c. All utility tunnels must be marked with signage.
   d. Prior to entering Confined Space Utility Tunnels, University Police must be informed of the anticipated duration and location of the work to be performed.
   e. Upon leaving a Confined Space Utility Tunnel, University Police must be notified that the utility tunnel has been vacated and work is complete.

v. **Additional Requirements**
   a. When working in a utility tunnel, access hatches near the work area must be opened and barricaded to ensure at least two points of entry and exit separate and remote from one another can be maintained; if a fixed ladder is not installed at the hatch, an extension ladder must be supplied.
   b. Prior to working in tunnels with mechanical ventilation, verify the ventilation is working properly at its control panel.

D. **Contractor Work in Tunnels**
   i. Contractors whose scope of work involves working in the tunnels will be informed of the conditions of and requirements for accessing the tunnels by Facilities Operations, Capital Projects, or Information Technology.
   ii. The contractor will assume overall responsibility for the work site.
   iii. If the contractor encounters additional hazards within the tunnel or performs work that creates an additional hazard, the contractor must:
       a. Exit the tunnel immediately,
       b. Bring additional hazards to Northwestern’s attention, and
       c. Comply with Northwestern’s Confined Spaces Program and applicable regulations (i.e., 29 CFR 1910.146 and 29 CFR 1926.800).